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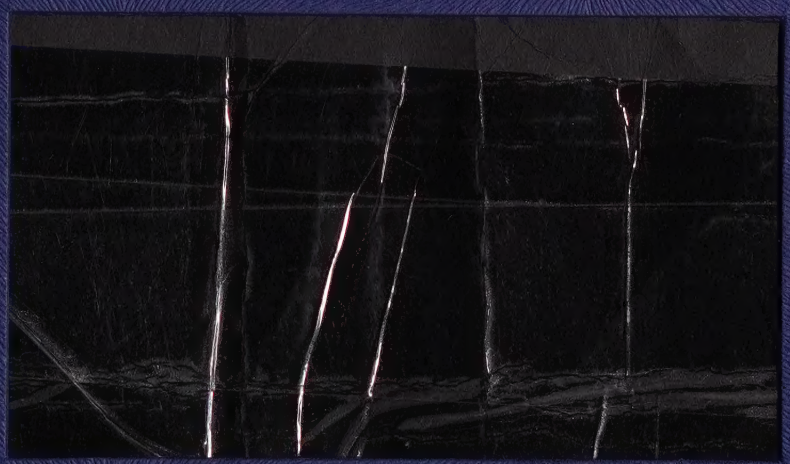

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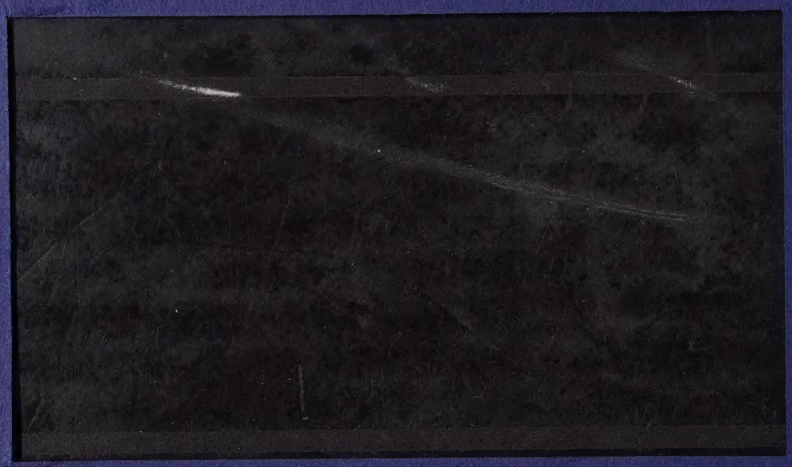

Handbook No. 612
C/ DLC/JMS June, 1959

Redifon

TECHNICAL DATA

HANDBOOK

- for -

F.S. DIVERSITY CONVERTER

TYPE AFS.11

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Although every practicable safety precaution has been incorporated in this equipment the following rules must be strictly observed:

KEEP AWAY FROM LIVE CIRCUITS. Under no circumstances should any person be permitted to reach within or in any manner gain access to any enclosure with power supply line switches to the equipment closed, or with interlock switches closed; or to connect any apparatus external to the enclosure to circuits within the equipment. Wherever feasible when testing circuits check for continuity and resistance rather than directly checking voltage at various points.

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AMENDMENTS TO HANDBOOK No 612 for AFS.11

Date	Page/Dwg/No.	Amendments
2.1.62	Page 3	Section 2.3, add:- Alternative output jack JK1 Discriminator test jack JK2 NOTE: JK1 and JK3 are physically identical, but whereas headphones may be used in JK3 to monitor the FSK signal, care must be taken not to plug them into JK1 by mistake because there is 300 volts present on the jack contacts.
2.1.62	Page 10	Last paragraph, lines 6 and 7:- delete - "V19 and pentode output valve V20, both type 6BW6", substitute - V18 and the flip-flop output stage (V19/V20)
2.1.62	Page 22	Section 6.4 (2):- delete - "maximum" substitute - minimum

Date	Page / Para No.	Amendment
4.1.62	Page 3	Section 2.3, add:- Alternative output jack 1K1 Discriminator test jack 1K2 NOTE: 1K1 and 1K3 are physically identical, but whereas headphones may be used in 1K3 to monitor the ISK signal, care must be taken not to plug them into 1K1 by mistake because there is 200 volts present on the jack contacts.
2.1.62	Page 10	Last paragraph, lines 6 and 7:- delete - "V19 and pentode output valve V20, both type 6BW6", substitute - V18 and the flip-flop output stage (V19/V20)
2.1.62	Page 22	Section 6.4 (2):- delete - "maximum" substitute - minimum

CONTENTS

1.0 INTRODUCTION

2.0 GENERAL DESCRIPTION

2.1 Dimensions and Weight
2.2 Physical Description
2.3 Monitoring Facilities
2.4 Controls

2.4.1 Monitor Switch S1
2.4.2 Channel Switch S2
2.4.3 Speed Switch S3
2.4.4 Sense Switch S4
2.4.5 Power On/Off Switch S5
2.4.6 Tuning Switch S301
2.4.7 Current Control RV10
2.4.8 C.R.T. Controls

2.5 Fuses and Lamp

3.0 TECHNICAL DESCRIPTION

3.1 Summary of Technical Data

3.1.1 Application
3.1.2 Input Impedance
3.1.3 Input Level
3.1.4 Input Frequencies (Space Diversity)
3.1.5 Limiter Receiving Time
3.1.6 Output
3.1.7 Keying Speed
3.1.8 Power Supply
3.1.9 Power Consumption

3.2 Circuit Description

3.2.1 General
3.2.2 Input to Converter
3.2.3 Band Pass Filters
3.2.4 Limiters
3.2.5 Input Level Metering Circuit
3.2.6 Discriminator

3.2.7 Combiner
3.2.8 Automatic Diversity Control
3.2.9 D. C. Chain
3.2.10 Monitor
3.2.11 Power Supply Unit

4.0 INSTALLATION

5.0 INITIAL ADJUSTMENTS AND OPERATIO

5.1 Dual Diversity (Space) Operation: Two Separate Receivers
5.2 Dual Diversity (Space) Operation: Common L. O. and Free separate B. F. O's
5.3 Single Receiver Space Diversity Operation

6.0 MAINTENANCE

6.1 General
6.2 Limiter Adjustments: RV1, RV2
6.3 Weight Adjustment: RV3
6.4 Automatic Diversity Control Adjustment: RV4
6.5 Monitor Amplifier Adjustments on Chassis: RV6, RV7, RV8, RV9
6.6 Spares and Replacements

APPENDIX Valves: Typical Voltage Values

DRAWINGS AND COMPONENTS LISTS

F.S. Diversity Converter AFS.11	Block Diagram	SK.3098/M	1
F.S. Diversity Converter AFS.11	Circuit Diagram	WD1/6051/L	1
Power Supply AFS.11	Circuit Diagram	WD1/6051/M	2
F.S. Diversity Converter AFS.11	Components List	WD1/6051/S	3-13
Frequency Determining Network	Circuit Diagram	WD1/6053/S	1
Tuning Network	Circuit Diagram	WD1/6054/M	1
Tuning Network	Components List	WD1/6054/S	2
AFS. Tuning Patterns	Illustration	SK.3097/S	1

INTRODUCTION

The Redifon Frequency Shift Space Diversity Converter Type AFS.11 converts Mark and Space frequencies from the audio output of one or two radio receivers into d.c. pulses suitable for the operation of a teleprinter or similar device.

It is intended for use with two-receiver space diversity systems, the weaker signal being suppressed in a combiner circuit. Single receiver operation may be used if desired. Before the combiner the audio tones of each channel are separated, limited, and demodulated. After the combiner the resultant signal is passed through a low-pass filter, suitably amplified, and used to drive an electronic relay. The d.c. output from this relay is "floating", i.e. neither side earthed, and can be used to operate any normal teleprinter. For standard frequency-shift operation variable tuning provides shift adjustment from 100 to 1000 c/s.

Designed for standard 19 inch rack mounting, the equipment is intended for use from a 100-125V or 200-250V, 50/60 c/s single-phase supply.

Although it is primarily intended for space diversity operation, the AFS.11 may also be supplied, to special order, in a form suitable for frequency diversity working.

2.0

GENERAL DESCRIPTION

2.1 DIMENSIONS AND WEIGHT

Height	Width	Depth	Weight
5¼ in.	19 in.	16 in.	52 lb.
13.3 cm.	48.3 cm.	40.6 cm.	23.6kg.

2.2 PHYSICAL DESCRIPTION

The Frequency Shift Space Diversity Converter Type AFC.11, with its incorporated power supply unit, is of compact construction, in a form suitable for standard 19 inch relay rack mounting. Monitoring facilities, consisting of a two inch cathode ray tube, input phone jack, two input volume level indicators and one output current indicator, are provided on the front panel. Also on this panel are sockets and controls, the latter including those for the cathode ray tube, and fuses, an indicator lamp which lights when the power unit main switch is on, and output and discriminator jack sockets.

At the rear are mounted a keying-speed switch, preset controls, and test-point sockets. The input from the a.c. mains supply is via a socket SK1 and plug PL1. This plug is mounted at the rear of the equipment; so also is a terminal board TB3 to which the inputs from the two receivers are connected.

2.3 MONITORING FACILITIES

Cathode ray tube	V30
Input phone jack	JK3
Input volume level indicators	M1, M2
Output current indicator	M3

2.4. CONTROLS

2.4.1 Monitor Switch S1

The function of this switch is to select the channel to be monitored by the cathode ray tube and the monitor jack. On front panel.

2.4.2 Channel Switch S2

This switch controls the channel contributions to the output. On front panel.

2.4.3 Speed Switch S3

The speed switch has two positions, FAST and SLOW, set for the speed of incoming signals. At rear.

2.4.4 Sense Switch S4

This switch determines the sense of the output. On front panel.

2.4.5 Power On/Off Switch S5

This is a double-pole switch controlling the a. c. mains input to the power unit. On front panel.

2.4.6 Tuning Switch S301

S301 is a switch used to select capacitors in tuning the space tank in space diversity applications. On front panel.

2.4.7 Current Control RV10

This is a variable resistor controlling the output current. Controlled from front panel.

2.4.8 C. R. T. Controls

Screwdriver adjustments on front panel

(a) Intensity	RV11
(b) Focus	RV12
(c) Horizontal	RV13
(d) Vertical	RV14

2.5 FUSES AND LAMP

These are mounted on the front panel.

A. C. (main) fuse	FS1
H. T. fuse	FS2
Power on indicator lamp	LP1

3.0

TECHNICAL DESCRIPTION

3.1 SUMMARY OF TECHNICAL DATA

3.1.1 Application

Conversion of mark and space frequencies from the output of one or two radio receivers into d.c. pulses, to operate a teleprinter or similar device.

3.1.2 Input Impedance

600 ohms unbalanced.

3.1.3 Input Level

Nominally: 0db (1 mW in 600 ohms)
Limits: - 40 to + 10 db.

3.1.4 Input Frequencies (Space Diversity)

Mark: 2975 c/s
Space: Tunable from 2575 c/s to 1975 c/s (400 to 1000 c/s shift but satisfactory operation down to 100 c/s on the 400 c/s position)

3.1.5 Limiter Recovery Time

Negligible for a 40 db differential between mark and space.

3.1.6 Output

Adjustable from 45 to 75 mA into 2000 ohms, floating (self-contained) teleprinter supply.

3.1.7 Keying Speed

800 bauds maximum, dependent on shift.

3.1.8 Power Supply

100-125 or 200-250 volts ± 10%, 50/60 c/s, single phase.

3.1.9 Power Consumption

200 W approx.

3.2 CIRCUIT DESCRIPTION

3.2.1 General

See Drawing SK. 3098/M

The input from each receiver follows a separate path part of the way through the converter, each path consisting of a band pass filter, input transformer, limiter, discriminator and rectifier, the outputs of the two rectifiers being combined in a diversity combiner circuit. The combined signals then pass through an impedance transformer to either a high speed or low speed low pass filter, as selected by the speed switch, to an a. c. amplifier, followed by a d. c. amplifier, a d. c. keyer and finally the electronic relay. An automatic diversity control circuit is connected between the two limiters, and the tuning monitor is connected between the discriminators. A d. c. level restorer, connected at the input of the d. c. amplifier, is provided.

3.2.2 Input to Converter.

See Drawing WD1/6051/L

For space diversity operation the output of one receiver is connected to terminals 1 and 2 of terminal board TB3, and the output of the other to terminals 6 and 7.

3.2.3 Band Pass Filters

See Drawing WD1/6053/S

Each R-C band pass filter forms part of a plug-in unit, and consists of a resistor R201 in series with capacitors C201 and C202 in parallel. The pass band is from 1900 to 3100 c/s. The plug-in units are connected via sockets SK2 and SK3 respectively (Drawing WD1/6051/L).

3.2.4 Limiters

The function of the limiters is to eliminate any amplitude fluctuations in the signal. This is accomplished with a minimum of noise and with extremely fast recovery time characteristics by using balanced circuitry in conjunction with special coupling circuits.

The audio tone outputs of the two band pass filters are applied to the primaries of input transformers TR1 and TR2 respectively. The resulting voltage across the

secondary of TR1 acts as push-pull input to two stages of balanced d. c. amplification, incorporating double triodes V1 and V2, type 12AU7. The secondary voltage of TR2 is amplified in a similar manner by double-triodes V7 and V8, type 12AU7.

Double-triode V2 provides an amplified output which acts as push-pull input to two stages of a. c. amplification and limiting, incorporating double-triodes V3 and V4, type 12AX7, and selenium rectifiers MR1, MR2, MR3 and MR4. In these stages variations in amplitude are removed, the selenium rectifiers assuring symmetrical charging and discharging of the coupling capacitors and giving the limiting action an extemely fast recovery time. For input signal levels of -40 db and greater, the output of the limiter consists essentially of square waves.

In the same way the output of double-triode V8 provides push-pull input to two similar stages of a. c. amplification, incorporating double-triodes V9 and V10, type 12AX7, and selenium rectifiers MR5, MR6, MR7 and MR8.

3.2.5 Input Level Metering Circuit

Meters M1 and M2 are connected across the anode circuits of valves V1 and V7 respectively to give an indication of the input levels of the two channels. The amplification given by the valves is necessary to compensate for the insertion loss of the band pass filters.

3.2.6 Discriminator

The Mark tuned (2975 c/s) circuit for each channel consists of L201 and C204, forming part of the same plug-in unit as the band-pass filter for that channel (see Drawing WD1/6053). Also forming part of that unit is the Space tuned circuit inductance L202 and the greater part of the capacitance, the variable portion of the Space tank capacitance being contained in a tuning network plug-in unit (see Drawing WD1/6054/M) and controlled by Tuning selector switch S301. The Space tank tuned circuit can be varied to allow for frequency shifts of 400 to 1000 c/s down from 2975 c/s. The 400 c/s position is suitable for working down to 100 c/s.

The outputs of the tuned circuits are full-wave rectified by double-diodes V5 and V6 (Channel 1) and V11 and V12 (Channel 2), all type 6AL5. The rectified outputs of

the Mark tank circuits are positive and those of the Space tank circuits negative.

3.2.7 Combiner

The rectified discriminator outputs are combined, via the channel switch S2, at resistors R38, R39, R40. A moderate degree of filtering of the carrier frequencies is afforded by capacitors C13, C14 and C15.

If the channel switch is in either the REC1 or REC2 position, only the channel indicated is connected to R38 and R39, therefore only that channel controls the output of the converter.

If the channel switch is in the DIVERSITY position, both channel discriminator Mark outputs are connected to R38 while both discriminator Space outputs are connected to R39.

Diversity combining takes place as follows:-

If Channel 1 has a stronger Mark signal than Channel 2, the stronger positive output of Channel 1, across R38, will raise the cathode of V11 positive, cutting off V11 and thereby disconnecting the Mark contribution of Channel 2 as long as Channel 1 has the stronger signal. Similarly, if Channel 2 has the stronger Mark signal the cathode of V5 will be raised positive, and that valve will be cut off, disconnecting the Mark contribution of Channel 1.

A similar action takes place at R39 for Space signals, the stronger channel cutting off the weaker channel by driving the anode of V6 or V12 negative.

3.2.8 Automatic Diversity Control

The automatic diversity control circuit further decreases the limiter output of the channel with the weaker signal, thus helping the combiner to select the stronger signal. The limiter output is controlled in the following manner.

Double-triode V21, type 12AT7, is biased to cut-off. Incoming signals to Channel 1 are amplified by V1 and V2. The positive output of V2 is selected by metal rectifier MR9

and drives V21A into conduction. The anode current of V21A will therefore depend on the strength of the signal in Channel 1, and the greater this anode current the lower will be the voltage at point Y. As the voltage at this point is the h.t. voltage applied to the anodes of double-triode V10, the last stage of the Channel 2 limiter, it determines the total anode swing of that valve and thus the limiter output of Channel 2. In a similar manner the h.t. voltage for V4, the last stage of the Channel 1 limiter, is taken from point X and controlled by V21B, the input to V21B being the positive output of V8 selected by selenium rectifier MR10. If the two channels are receiving signals of equal strength the amplitude of the discriminator output (available at Discr. jack socket JK2) will be about half that of the output for single channel operation.

When channel switch S2 is in the REC 1 or REC 2 position, V21 is strongly cut off by a - 150V grid bias applied via switch bank S2/a, and the output of the channel indicated is therefore maximum.

3.2.9 D.C. Chain

The combined Mark and Space signals appear across R40 and are applied to the grid of V13A, one section of double-triode V13, type 12AU7. V13A is used to match the impedance of the low-pass filter LPF1, which is connected in circuit by the speed switch S3 in the SLOW position. This position of the switch is used for maximum noise rejection at keying speeds of less than 100 bauds. For speeds faster than 100 bauds the speed switch should be in the FAST position, replacing LPF1 by resistor R170.

Resistor R78 in series with the low-pass filter or with R170 (depending on the position of S3) in the cathode circuit of V13A, is also the cathode resistor of V13B. The output of V13A, via either LPF1 or R170, therefore acts as cathode input to V13B, functioning as an a.c. amplifier. Double-diode V14, type 6AL5, and double-triode V15, type 12AU7, act as a d.c. restorer, assuring centre slicing of the output from the d.c. amplifier V16A, one section of double-triode V16, type 12AU7. This is accomplished by charging capacitor C18 with positive signal elements through one diode section of V14 while C17 is charged with negative signal elements through the other diode section.

The average value of these positive and negative elements is obtained at the junction of resistors R82 and R83, and applied to the grid of one section of double-triode V15, the output being taken from the cathode resistor of this triode section to determine the bias on the d. c. amplifier V16A. The output of V13B is also applied to the grid of the other section of V15, the cathode output of this section being applied to the grid of V16A. Variation of the bias on the d. c. amplifier compensates for long term d. c. level variations due to the a. c. coupling.

The output of V16A is directly coupled to the grid of V17A, one section of a double-triode V17, type 12AU7, which functions as a d. c. keyer. V17A is an amplifier directly coupled to buffer V17B which, in turn, provides a cathode input to the amplifier V17A, the regeneration resulting in a trigger action. The cathode output voltage of the keyer is applied via neon tube LP3 to one position of Sense switch S4, while a portion of that output voltage, obtained from the junction of resistors R94 and R95, is amplified and inverted by V16B then applied via neon tube LP2 to the other position of S4.

The Sense switch S4 therefore selects either the output of the d. c. keyer, or an inverted version of it, to drive the electronic relay.

The action of the electronic relay is as follows:

Heptode V18, type E91H, functions as an electron-coupled oscillator, the frequency-determining circuit C23, L1, C24 and C25 being connected between screen and first grid. The frequency is of the order of 400 kc/s.

The anode output of V18 is gated on and off by the output of V16B or V17B, as selected by the Sense switch. The primary of transformer T7, in the anode circuit of V18, is tuned to the oscillator frequency, and so also is the secondary. The output circuit is electrically isolated from the remainder of the converter since the only coupling between the pentode amplifier V19 and pentode output valve V20, both type 6BW6, is the magnetic coupling between primary and secondary of T7. The secondary voltage of T7 is applied to a voltage doubler circuit, consisting of selenium rectifiers MR13 and MR14, and capacitors C29 and C30, the output of which, after amplification by V19, forms the input to V20. The anode currents of V19 and V20 are mutually at 180°, so that the load on the output power supply is balanced.

The output current, controlled by variation of the screen voltages of V19 and V20 by means of RV10, flows through output meter M3, and is available at either the rear terminal board TB3 or the Output jack socket JK1.

3.2.10 Monitor

The output voltages of the Mark and Space tuned circuits are amplified by double-triode V29, type 12AX7, those for Channel 1 being applied to the valve when the Monitor switch S1 is in the CH1 position, and those for Channel 2 when it is in the CH2 position. The Mark tank circuit output is amplified by V29A and the Space tank circuit output by V29B.

The output of V29 is applied to the horizontal deflection plates of the monitor cathode ray tube V30, type DG4-1.

The output of V17, after differentiation by C43, R148, R149 and R157, provides vertical sweep.

The basis of the pattern produced on the cathode ray tube screen is as follows. When Mark frequency is present, the output of the Mark tank circuit produces a horizontal trace to the right side of the cathode ray tube, while the positive output of V17 causes an upward sweep. When Space frequency is received, the output of the Space tank circuit gives rise to a horizontal trace to the left of the tube, while the negative output of V17 causes a downward sweep.

The amplitude controls for the monitor, RV6 for Channel 1 and RV7 for Channel 2, determine the bias on the monitor amplifier V29.

The controls RV8 and RV9 adjust for equal amplification of the mark or Space signals by varying the cathode bias resistors of V29A and V29B.

The positive voltage for biasing V29 is taken from points X and Y, to keep the monitor pattern size from changing as the automatic diversity control voltage changes with signal strength.

Variable resistors RV11 and RV12 act as intensity and focus controls, while RV13 and RV14 provide horizontal and vertical control of centering.

3.2.11 Power Supply Unit

The power supply unit is connected to the 100-125V or 200-250V, 50/60 c/s single-phase supply via socket SK.1 and plug PL1. The input is applied, via AC fuse FS.1 (3A) and double - pole On/Off Switch S5 to the primaries of three transformers, TR3, TR4 and TR5.

Each transformer has two primaries, which can be connected in series or in parallel, and this, with the primary tappings provided, permits the equipment to be used on 100-125 or 200-250V single-phase supplies.

Apart from heater supplies, the power unit can be regarded as consisting of two main parts: (i) the main supply taken from the secondary of transformer TR3, and (ii) the output stage power supply taken from the secondary of TR4.

The main supply consists of the following:

(a) A stabilized voltage supply at +200V and +125V. This is obtained from one secondary of TR3, rectified by full-wave rectifiers V23 and V24, both type 6X4 double-diodes functioning as single diodes, smoothed by C49, L2 and C50, and applied to a stabilising circuit consisting of series regulator V25, triode type A2293, voltage amplifier V27, pentode type 6AV6, and voltage stabiliser V28, type 0B2. Capacitors C58 and C61 are connected in parallel with L2, the resulting parallel circuit being tuned to reduce any second harmonic component in the rectifier output. The stabilised voltage output level can be adjusted by means of RV5.

(b) A positive 350V supply for the automatic diversity control circuit. This is taken from the unregulated side of valve V25. Both this supply and the stabilised supply are protected by H. T. fuse FS.2 (150mA).

(c) A negative high voltage supply for the cathode ray tube. This is derived from the same secondary of TR3 by a voltage-doubler circuit using selenium rectifiers MR15 and MR16.

(d) A circuit providing -43V and -150V, the former being the bias for the automatic diversity control circuit when the channel switch S2 is in the DIVERSITY position, the latter providing the cut-off bias for that circuit when S2 is at REC1 or REC2 and also the bias for V17. This circuit utilizes selenium rectifier MR17 and voltage regulator V22, type OA2.

The output stage power supply consists of the following:-

(a) A full-wave rectifier circuit across one secondary of TR4 giving, after smoothing, +300V. Double-diode V26, type 6X4, is employed as rectifier, and its output is smoothed by C53, L3 and C54, L3 being tuned with C59 and C60 to minimise any second harmonic present in the output of V26.

(b) A circuit providing -400V for negative bias. This is fed from the same secondary of TR4 and employs selenium rectifier MR18, the output being smoothed by C55, R128 and C56.

Another secondary winding on TR3 supplies the heaters of all valves, except V26, in the power supply. Valves V1 to V13, also V21, derive their heater supplies from another secondary on TR4, and the heaters of valves V14 to V20 in the converter, with V26 in the power supply unit, are supplied from two secondaries on TR5. Power indicator lamp LP1 is connected across a third secondary of TR5 and lights when the supply is connected and switch S5 is closed; this secondary feeds the heater of valve V29 and also the primary of transformer TR6, the secondary of which supplies the heater of cathode ray tube V30.

INITIAL ADJUSTMENTS AND OPERATION

5.1 DUAL DIVERSITY (SPACE) OPERATION: TWO SEPARATE RECEIVERS

Allow the system adequate warm-up time (at least twenty minutes) before tuning is commenced.

Set converter controls as follows:

Power switch	S5	ON
Monitor switch	S1	CH 1
Channel switch	S2	REC 1
Sense switch	S4	+ (plus)
Current control	RV10	At minimum

C. R. T. controls (Horizontal RV13, Vertical RV14, Intensity RV11, Focus RV12 should be adjusted as required to obtain the pattern.

Adjust receiver controls as follows:

L. O.	Set for required frequency
B. F. O.	Set about 2550 c/s above intermediate frequency
A. V. C.	On & Fast
R. F. gain control	Full on
Crystal filter	Off
I. F. bandwidth	2500-3000 c/s
Audio gain	For 0 db indication on channel input meter

The teleprinter primary power switch should be off during the line up.

Request a steady Mark from the transmitting station if possible. Adjust the receiver L. O. frequency vernier control for maximum Mark frequency trace (see tuning pattern, Drawing SK. 3097/S).

Adjust the converter Current control RV10 for a reading of 60 mA on meter M3. Request a keying signal from the transmitting station and adjust the discriminator Tuning control S301 for maximum Space deflection.

The keying pattern should correspond to the "Properly Tuned" pattern on Drawing SK. 3097/S. Patterns due to various incorrect adjustments are also shown on this drawing.

Set the monitor switch S1 to CH 2 and the channel switch S2 to REC 2. The correct pattern should again be obtained, if receiver 2 is properly set.

Set the channel switch S2 to DIVERSITY.

The teleprinter should now be powered, and correct copy should be obtained.

If a receiver b.f.o. frequency below the intermediate frequency is used, or Mark and Space are inverted at the transmitter, throw the Sense switch S4 to - (minus).

5.2 DUAL DIVERSITY (SPACE) OPERATION: COMMON L.O. AND FREE SEPARATE B.F.O'S.

Allow the system adequate warm-up time, as in Section 5.1.

Set the converter controls as in Section 5.1.

Adjust the receiver L.O. frequency vernier control so that the receivers are tuned.

Adjust the B.F.O. of receiver 1 for maximum Mark deflection.

Adjust the Mark current to 60mA.

Adjust the converter Tuning switch S301 for maximum Space deflection.

Set the monitor switch S1 to CH 2 and the channel switch S2 to REC 2.

Set the B.F.O. of receiver 2 for maximum Mark deflection. The correct pattern should now be obtained.

The teleprinter should now be powered, and correct copy obtained.

5.3 SINGLE RECEIVER (SPACE) DIVERSITY OPERATION

The single receiver may be connected to either Channel 1 or Channel 2 input, or to both inputs if desired.

The switches must be set to the appropriate positions for the channel selected, and tuning procedure is as outlined in Section 5.1.

6.0

MAINTENANCE

6.1 GENERAL

As all components in the converter are operated within their ratings, the only trouble likely to be encountered is valve failure. Typical valve voltage readings are given in the Appendix. All valves should be checked after each 2000 hours of operation, and any showing unsatisfactory or doubtful characteristics should be replaced.

6.2 LIMITER ADJUSTMENTS: RV1, RV2.

If it becomes necessary to change any of valves V1-V4, or of V7-V10, it will be necessary to readjust RV1 or RV2 for optimum operation of the limiter. This adjustment should be made as follows:

(1) Connect a steady tone, in the pass band, to the input of the channel concerned.

(2) With oscilloscope from an anode of the last limiter valve in the channel concerned, V4 or V8, reduce the level of the input signal until the output is no longer limited.

(3) Adjust RV1 or RV2, as appropriate, for maximum output, reducing the input level still further if limiting takes place.

6.3 WEIGHT ADJUSTMENT : RV3.

If it becomes necessary to change one of the valves in the d. c. chain, readjustment of RV3 may be needed. This adjustment should be made as follows:

(1) Connect test tone keying sources or normal signal sources of the correct channel frequencies.

(2) Key the tone source with square waves of 50-50 weight.

(3) Set the channel switch S2 to DIVERSITY.

(4) With oscilloscope from pin 8 of V17, adjust RV3 for 50-50 weight, using an overlap pattern.

(5) Throw the channel switch to REC 1 and then to REC 2, re-adjusting RV3 for the best position for all three channel switch positions.

6.4 AUTOMATIC DIVERSITY CONTROL ADJUSTMENT: RV4.

If any of the limiter valves V1-V4, V7-V10, have to be changed, it will be necessary to readjust RV4 as follows:

(1) Key both channels, as in the weight adjustment procedure (Section 6.3).

(2) With the oscilloscope in the discriminator jack socket JK2, adjust RV4 for minimum discriminator output.

6.5 MONITOR AMPLIFIER ADJUSTMENTS ON CHASSIS: RV6, RV7, RV8, RV9.

These adjustments should be made with the keying sources connected to the converter, as in the weight adjustment procedure (Section 6.3). However, the carrier frequencies used must be within 3 c/s of the Mark and Space frequencies.

(1) Tune the Mark and Space tank circuits of Channel 1 for maximum.

(2) Set the monitor switch S1 to CH 1

(3) Set the channel switch S2 to DIVERSITY

(4) Adjust RV6 for correct horizontal size ($\frac{1}{4}$ inch to 5/8 inch) with the input signal -20 db on Channel 1, and with the input signal 0 db on Channel 2.

(5) Adjust RV8 for Mark-Space balance.

(6) Set the monitor switch to CH 2

(7) Adjust the input to Channel 2 to -20 db, and the input to channel 1 to 0 db.

(8) Adjust RV7 for correct horizontal size.

(9) Adjust RV9 for Mark-Space balance.

6.6 SPARES AND REPLACEMENTS

To ensure receiving the correct item, and to expedite delivery when ordering spare and replacement parts, please quote:

(1) Type number of equipment, as shown on label.

(2) Serial number of unit.

(3) Circuit reference as shown on circuit diagram.

Additional or alternative useful information is the number of the Circuit Drawing, or the Components List number and sheet number or as shown in Spares Schedules.

CIR. REF.	COMPONENT DESCRIPTION.	REF. No.	VALUE	TOL %	RATING	ISSUE
	CAPACITORS					
C1	TYPE: W48. LIST. No. A306	HUNTS	0·1 μF	±20	250V.W	1
C2	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C3	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C4	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C5	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C6	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C7	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C8	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W.	
C9	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C10	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C11	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C12	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C13	TYPE: L2/1. LIST No. H1356A	HUNTS	5000 pF	±10	500V.W	
C14	TYPE: L2/1. LIST No. H1356A	HUNTS	5000 pF	±10	500V.W	
C15	TYPE: L2/1. LIST No. H1354A	HUNTS	3000 pF	±10	500V.W	
C16	TYPE: W48. LIST No. A309	HUNTS	1 μF	±20	250V.W	
C17	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W.	
C18	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C19	TYPE: L2/1. LIST No. H1358A	HUNTS	8000 pF	±10	500V.W	
C20	TYPE: L2/1. LIST No. H1354A	HUNTS	3000 pF	±10	500V.W	
C21	TYPE: W48. LIST No. A306	HUNTS	0·1 μF	±20	250V.W	
C22	TYPE: L1/25	HUNTS	1000 pF	±10	350V.W	
C23	TYPE: L2/15	HUNTS	3000 pF	±5	350V.W	
C24	TYPE: L5/15	HUNTS	300 pF	±5	250V.W.	
C25	TYPE: L5/15	HUNTS	500 pF	±5	250V.W.	
C26	TYPE: W99. LIST No. B810	HUNTS	0·01 μF	±20	400V.W	
C27	TYPE: L5/15	HUNTS	100 pF	±10	250V.W	
C28	TYPE: L5/15	HUNTS	100 pF	±10	250V.W	
C29	TYPE: L5/15	HUNTS	300 pF	±5	250V.W	
C30	TYPE: L5/15	HUNTS	300 pF	±5	250V.W	
C31	TYPE: W99. LIST No. B810	HUNTS	0·01 μF	±20	400V.W	
C32	TYPE: W99. LIST No. B810	HUNTS	0·01 μF	±20	400V.W.	
C33	TYPE: A 21T4U (FOR USE WITH UNITS OF SERIAL No's 50 TO 74 INCL. ONLY)	TCC	1+1 μF	±20	600V.W	
C34						
C35	TYPE: W99. LIST No. B.810	HUNTS	0·01 μF	±20	400V.W	
C36	TYPE: W99. LIST No. B.810	HUNTS	0·01 μF	±20	400V.W	
C37	TYPE: W48 LIST No. A306	HUNTS	0·1 μF	±20	250V.W	

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
TEF	27.10.58			L. Pohlle.	14/11/58.

REDIFON LTD. LONDON.	TITLE	SHEET	DWG. No.
	F.S. DIVERSITY CONVERTER. AFS. 11	3 CONT.	WD1/6051/L&M

CIR. REF.	COMPONENT DESCRIPTION.	REF No.	VALUE	TOL %	RATING
C38	TYPE M301. LIST. Nº AM108	HUNTS	0·1μF	±20	350v.w
C39	NOT USED				
C40	TYPE: W48. LIST. Nº A306	HUNTS	0·1μF	±20	250v.w
C41	TYPE: W48. LIST. Nº A306	HUNTS	0·1μF	±20	250v.w
C42	TYPE: W99 LIST. Nº B810	HUNTS	·01μF	±20	400v.w
C43	TYPE: L2/1 LIST Nº H1353 A	HUNTS	2000pF	±10	500v.w
C44	TYPE: L51 LIST Nº A65	HUNTS	·1μF	±20	600v.w
C45	TYPE: L51 LIST Nº A75	HUNTS	·1μF	±20	1000v.w
C46	TYPE: W48 LIST Nº A302	HUNTS	0·5μF	±20	150v.w
C47	TYPE A1BT4S	T.C.C	·5+·5μF	±20	600v.w
C48	FOR USE WITH UNITS OF SERIAL Nº's 50 TO 74 INC. ONLY				
C49	TYPE AF41T	T.C.C	4μF	±20	600v.w
C50	TYPE AF41T	T.C.C	4μF	±20	600v.w
C51	TYPE W48 LIST Nº A340.	HUNTS	1μF	±20	350v.w
C52	TYPE W48 LIST Nº A309	HUNTS	1μF	±20	250v.w
C53	TYPE AF41T	T.C.C	4μF	±20	600v.w
C54	TYPE AF41T FOR USE WITH UNITS OF SERIAL	T.C.C	4μF	±20	600v.w
C55	TYPE A1BT4S Nº's 50 TO 74 INCL. ONLY	T.C.C	·5+·5μF	±20	600v.w
C56					
C57	TYPE W97 LIST Nº BM14	HUNTS	·02μF	±20	200v.w
C58	TYPE W48 LIST Nº A306	HUNTS	·1μF	±20	250v.w
C59	TYPE W48 LIST Nº A306	HUNTS	·1μF	±20	250v.w
C60	TYPE W48 LIST Nº A306	HUNTS	·1μF	±20	250v.w
C61	TYPE W48 LIST Nº A306	HUNTS	·1μF	±20	250v.w
C62	TYPE W99 LIST Nº B810	HUNTS	·01μF	±20	400v.w
C63	TYPE W99 LIST Nº B810	HUNTS	·01μF	±20	400v.w
C64	TYPE W48 LIST Nº A306	HUNTS	0·1μF	±20	250v.w
C65	TYPE K3000/CD4	ERIE	·005μF	+40 −20	750v.w
	RESISTORS				
R1	TYPE BTS	DUBILIER	7·5KΩ	±5	½ w
R2	TYPE BTS	DUBILIER	7·5KΩ	±5	½ w
R3	TYPE BTS	DUBILIER	56KΩ	±5	½ w
R4	TYPE BTS	DUBILIER	56KΩ	±5	½ w

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL.	29·10·58				14/11/58

REDIFON LTD. LONDON	TITLE F.S. DIVERSITY CONVERTER AFS 11	SHEET 4 CONT.	DWG. No. WD1/6051/L&M

CIR. REF.	COMPONENT DESCRIPTION.	REF. No.	VALUE	TOL %	RATING
R5	TYPE BTS	DUBILIER	62KΩ	±5	½W
R6	TYPE BTS	DUBILIER	62KΩ	±5	½W
R7	TYPE BTS	DUBILIER	56KΩ	±5	½W
R8	TYPE BTS	DUBILIER	56KΩ	±5	½W
R9	TYPE BTS	DUBILIER	62KΩ	±5	½W
R10	TYPE BTS	DUBILIER	62KΩ	±5	½W
R11	NOT USED				
R12	TYPE BTS	DUBILIER	100KΩ	±5	½W
R13	TYPE BTS	DUBILIER	100KΩ	±5	½W
R14	TYPE BTS	DUBILIER	1KΩ	±10	½W
R15	TYPE BTS	DUBILIER	100KΩ	±5	½W
R16	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R17	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R18	TYPE BTS	DUBILIER	100KΩ	±5	½W
R19	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R20	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R21	TYPE BTS	DUBILIER	200KΩ	±5	½W
R22	TYPE BTS	DUBILIER	200KΩ	±5	½W
R23	TYPE BTS	DUBILIER	51KΩ	±5	½W
R24	TYPE BTS	DUBILIER	100KΩ	±5	½W
R25	TYPE BTS	DUBILIER	100KΩ	±5	½W
R26	TYPE BTS	DUBILIER	100KΩ	±5	½W
R27	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R28	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R29	TYPE BTS	DUBILIER	100KΩ	±5	½W
R30	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R31	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R32	TYPE BTS	DUBILIER	200KΩ	±5	½W
R33	TYPE BTS	DUBILIER	200KΩ	±5	½W
R34	TYPE BTS	DUBILIER	220KΩ	±5	½W
R35	TYPE BTS	DUBILIER	220KΩ	±5	½W
R36	TYPE BTS	DUBILIER	220KΩ	±5	½W
R37	TYPE BTS	DUBILIER	220KΩ	±5	½W
R38	TYPE BTS	DUBILIER	510KΩ	±5	½W
R39	TYPE BTS	DUBILIER	510KΩ	±5	½W
R40	TYPE BTS	DUBILIER	2·2MΩ	±5	½W
R41	TYPE BTS	DUBILIER	7·5KΩ	±5	½W
R42	TYPE BTS	DUBILIER	7·5KΩ	±5	½W

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	29·10·58			[signature]	14/11/58

REDIFON LTD. LONDON	TITLE F.S DIVERSITY CONVERTOR AFS 11	SHEET 5 CONT	DWG. No. WD1/6051/L&M

ISSUE 1

CIR. REF.	COMPONENT DESCRIPTION.	REF. No.	VALUE	TOL %	RATING	ISSUE
R43	TYPE BTS	DUBILIER	56KΩ	±5	½w	
R44	TYPE BTS	DUBILIER	56KΩ	±5	½w	1.
R45	TYPE BTS	DUBILIER	62KΩ	±5	½w	
R46	TYPE BTS	DUBILIER	62KΩ	±5	½w	
R47	TYPE BTS	DUBILIER	56KΩ	±5	½w	
R48	TYPE BTS	DUBILIER	56KΩ	±5	½w	
R49	TYPE BTS	DUBILIER	62KΩ	±5	½w	
R50	TYPE BTS	DUBILIER	62KΩ	±5	½w	
R51	NOT USED					
R52	TYPE BTS	DUBILIER	100KΩ	±5	½w	
R53	TYPE BTS	DUBILIER	100KΩ	±5	½w	
R54	TYPE BTS	DUBILIER	1KΩ	±10	½w	
R55	TYPE BTS	DUBILIER	100KΩ	±5	½w	
R56	TYPE BTS	DUBILIER	2·2MΩ	±5	½w	
R57	TYPE BTS	DUBILIER	2·2MΩ	±5	½w	
R58	TYPE BTS	DUBILIER	100KΩ	±5	½w	
R59	TYPE BTS	DUBILIER	2·2MΩ	±5	½w	
R60	TYPE BTS	DUBILIER	2·2MΩ	±5	½w	
R61	TYPE BTS	DUBILIER	200KΩ	±5	½w	
R62	TYPE BTS	DUBILIER	200KΩ	±5	½w	
R63	TYPE BTS	DUBILIER	51KΩ	±5	½w	
R64	TYPE BTS	DUBILIER	100KΩ	±5	½w	
R65	TYPE BTS	DUBILIER	100KΩ	±5	½w	
R66	TYPE BTS	DUBILIER	100KΩ	±5	½w	
R67	TYPE BTS	DUBILIER	2·2MΩ	±5	½w	
R68	TYPE BTS	DUBILIER	2·2MΩ	±5	½w	
R69	TYPE BTS	DUBILIER	100KΩ	±5	½w	
R70	TYPE BTS	DUBILIER	2·2MΩ	±5	½w	
R71	TYPE BTS	DUBILIER	2·2MΩ	±5	½w	
R72	TYPE BTS	DUBILIER	200KΩ	±5	½w	
R73	TYPE BTS	DUBILIER	200KΩ	±5	½w	
R74	TYPE BTS	DUBILIER	220KΩ	±5	½w	
R75	TYPE BTS	DUBILIER	220KΩ	±5	½w	
R76	TYPE BTS	DUBILIER	220KΩ	±5	½w	
R77	TYPE BTS	DUBILIER	220KΩ	±5	½w	
R78	TYPE BTS	DUBILIER	2·4KΩ	±5	½w	
R79	TYPE BTA	DUBILIER	100KΩ	±5	1w	
R80	TYPE BTS	DUBILIER	2·4KΩ	±5	½w	

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	29·10·58			L.J. Hills.	14/11/58

REDIFON LTD. LONDON	TITLE F·S DIVERSITY CONVERTOR AFS 11	SHEET 6 CONT	DWG. No. WD1/6051/L&M

CIR. REF.	COMPONENT DESCRIPTION.	REF. No.	VALUE	TOL %	RATING
R81	TYPE BTA	DUBILIER	47KΩ	±10	1W
R82	TYPE BTS	DUBILIER	3MΩ	±5	½W
R83	TYPE BTS	DUBILIER	3MΩ	±5	½W
R84	TYPE BTS	DUBILIER	10MΩ	±10	½W
R85	TYPE BTA	DUBILIER	3·3KΩ	±5	1W
R86	TYPE BTA	DUBILIER	5·1KΩ	±5	1W
R87	TYPE BTS	DUBILIER	47KΩ	±10	½W
R88	TYPE BTA	DUBILIER	30KΩ	±5	1W
R89	TYPE BTS	DUBILIER	75KΩ	±5	½W
R90	TYPE BTS	DUBILIER	100KΩ	±5	½W
R91	TYPE BTS	DUBILIER	1·2KΩ	±10	½W
R92	TYPE BTA	DUBILIER	10KΩ	±5	1W
R93	TYPE BTA	DUBILIER	4·7KΩ	±5	1W
R94	TYPE BTS	DUBILIER	560KΩ	±5	½W
R95	TYPE BTS	DUBILIER	330KΩ	±5	½W
R96	TYPE BTA	DUBILIER	100KΩ	±5	1W
R97	TYPE BTS	DUBILIER	150KΩ	±5	½W
R98	TYPE BTS	DUBILIER	150KΩ	±5	½W
R99	TYPE BTS	DUBILIER	100KΩ	±5	½W
R100	TYPE BTA	DUBILIER	43KΩ	±5	1W
R101	TYPE BTS	DUBILIER	220KΩ	±5	½W
R102	TYPE BTS	DUBILIER	2·2KΩ	±10	½W
R103	TYPE BTA	DUBILIER	62KΩ	±5	1W
R104	TYPE BTS	DUBILIER	2·2KΩ	±10	½W
R105	TYPE BTS	DUBILIER	470KΩ	±5	½W
R106	TYPE BTS	DUBILIER	10KΩ	±5	½W
R107	WIREWOUND 'SILERTEX' STYLE 2400X	ERIE	2KΩ	±5	10W
R108	TYPE 2HS 3 HIGH STAB. CARBON	RADIO RESISTOR Co	910KΩ	±2	½W
R109	TYPE 2HS 3 HIGH STAB. CARBON	RADIO RESISTOR Co	1·2MΩ	±2	½W
R110	TYPE BTA	DUBILIER	30KΩ	±5	1W
R111	TYPE BTA	DUBILIER	3K	±5	1W
R112	TYPE BTA	DUBILIER	30KΩ	±5	1W
R113	TYPE BTA	DUBILIER	43KΩ	±5	1W
R114	NOT USED				
R115	NOT USED				
R116	TYPE BTS	DUBILIER	680KΩ	±5	½W
R117	TYPE BTS	DUBILIER	680KΩ	±5	½W
R118	TYPE BTA	DUBILIER	100Ω	±10	1W

ISSUE 1. 2

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	30·10·58			L.J. Hollis	14/11/58

REDIFON LTD. LONDON	TITLE F·S DIVERSITY CONVERTOR AFS 11	SHEET 7 CONT.	DWG. No. WD1/6051/L&M

S.W.B.O.S.

CIR. REF.	COMPONENT DESCRIPTION.	REF. No.	VALUE	TOL %	RATING	ISSUE
R157	TYPE BTS	DUBILIER	240 KΩ	±5	½ w	
R158	NOT USED					1.
R159	NOT USED					
R160	TYPE BTS	DUBILIER	240K Ω	±5	½ w	2.
R161	TYPE BTS	DUBILIER	430K Ω	±5	½ w	
R162	TYPE BTS	DUBILIER	680K Ω	±5	½ w	3
R163	TYPE BTS	DUBILIER	100K Ω	±5	½ w	
R164	TYPE BTS	DUBILIER	22K Ω	±5	½ w	
R165	TYPE BTS	DUBILIER	22K Ω	±5	½ w	4
R166	TYPE BTS	DUBILIER	22K Ω	±5	½ w	
R167	TYPE BTS	DUBILIER	22K Ω	±5	½ w	
R168	TYPE BTS	DUBILIER	56K Ω	±5	½ w	
R169	TYPE BTA	DUBILIER	51K Ω	±5	1 w	
R170	TYPE BTS	DUBILIER	560 Ω	±5	½ w	
R171	NOT USED					
R172	NOT USED					
R173	NOT USED					
R174	NOT USED					
R175	TYPE BTS	DUBILIER	2·2K Ω	±10	½ w	
R176	TYPE BTS	DUBILIER	2·2K Ω	±10	½ w	
R177	TYPE BTS	DUBILIER	1·3M Ω	±5	½ w	
R178	TYPE BTA	DUBILIER	3K Ω	±5	1 w	
R179	TYPE BTA	DUBILIER	30K Ω	±5	1 w	
R180	TYPE BTA	DUBILIER	30K Ω	±5	1 w	
R181	WIREWOUND 'SILERTEX' STYLE 2400 X	ERIE	2K Ω	±5	10W	
R182	TYPE MVI	PAINTON	21Ω	±5	4W	
R183	TYPE 8 (RRC7-H)	ERIE	27K Ω	±5		
R184	TYPE 8 (RRC7-H)	ERIE	27K Ω	±5		
	VARIABLE RESISTORS					
RV1	POT. TYPE 'EN' LINEAR	PLESSEY	50K Ω	±20	2w	
RV2	POT. TYPE 'EN' LINEAR	PLESSEY	50K Ω	±20	2w	
RV3	POT. TYPE 'YN' LINEAR	DUBILIER	250K Ω	±20	¼w	
RV4	POT. TYPE 'EN' LINEAR	PLESSEY	50K Ω	±20	2w	
RV5	POT. TYPE 'EN' LINEAR	PLESSEY	100K Ω	±20	2w	
RV6	POT. TYPE 'YN LINEAR	DUBILIER	25K Ω	±20	¼w	

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	30·10·58			L.J. Hills.	14/11/58

REDIFON LTD. LONDON.	TITLE F.S. DIVERSITY CONVERTOR AFS 11	SHEET 9 CONT	DWG. No. WD1/6051/L&M

E.W.B.O.S.

CIR. REF.	COMPONENT DESCRIPTION.	REF. No.	VALUE	TOL %	RATING
RV7	POT. TYPE 'YN' LINEAR	DUBILIER	25KΩ	±20	¼ W
RV8	POT. TYPE 'YN' LINEAR	DUBILIER	10KΩ	±20	¼ W
RV9	POT. TYPE 'YN' LINEAR	DUBILIER	10KΩ	±20	¼ W
RV10	POT. TYPE 'EN' LINEAR	PLESSEY	25KΩ	±20	2 W
RV11	POT. TYPE 'YN' LINEAR	DUBILIER	500KΩ	±20	¼ W
RV12	POT. TYPE 'YN' LINEAR	DUBILIER	1MΩ	±20	¼ W
RV13	POT. TYPE 'YN' LINEAR	DUBILIER	2MΩ	±20	¼ W
RV14	POT. TYPE 'YN' LINEAR	DUBILIER	2MΩ	±20	¼ W
	VALVES				
V1	TYPE 12 AU7	MULLARD			
V2	TYPE 12 AU7	MULLARD			
V3	TYPE 12 AX7	MULLARD			
V4	TYPE 12AX7	MULLARD			
V5	TYPE 6AL5	MULLARD			
V6	TYPE 6AL5	MULLARD			
V7	TYPE 12 AU7	MULLARD			
V8	TYPE 12 AU7	MULLARD			
V9	TYPE 12AX7	MULLARD			
V10	TYPE 12AX7	MULLARD			
V11	TYPE 6AL5	MULLARD			
V12	TYPE 6AL5	MULLARD			
V13	TYPE 12AU7	MULLARD			
V14	TYPE 6AL5	MULLARD			
V15	TYPE 12AU7	MULLARD			
V16	TYPE 12 AU7	MULLARD			
V17	TYPE 12 AU7	MULLARD			
V18	TYPE E91H	MULLARD			
V19	TYPE 6BW6	BRIMAR			
V20	TYPE 6BW6	BRIMAR			
V21	TYPE 12AT7	MULLARD			
V22	TYPE 0A2	MULLARD			
V23	TYPE 6X4	BRIMAR			
V24	TYPE 6X4	BRIMAR			

ISSUE 1.

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	30/10/58			C.J. Hull	14/11/58

REDIFON LTD. LONDON.	TITLE F.S. DIVERSITY CONVERTOR AFS 11	SHEET 10 CONT.	DWG. No. WD1/6051/L&M

CIR. REF.	COMPONENT DESCRIPTION.	REF No.	VALUE	TOL %	RATING	ISSUE
V25	TYPE A 2293	G.E.C.				
V26	TYPE 6X4	BRIMAR				1.
V27	TYPE 6AU6	MULLARD				
V28	TYPE OB2	MULLARD				2.
V30	C.R. TUBE TYPE DG4-1	MULLARD				
V29	TYPE 12AX7	MULLARD				
	FUSES					
FS1	TYPE L·562	BELLING LEE			4A OR 7A.	
FS2	TYPE L·562	BELLING LEE			·150A	
	LAMPS					
LP1	TYPE 528 M.C.C. 10mm.	VITALITY	8v		·3A.	
LP2	TYPE T49, NEON.	ARCOLECTRIC				
LP3	TYPE T49, NEON.	ARCOLECTRIC				
	JACKS					
JK1	TYPE P71	IGRANIC				
JK2	TYPE P71	IGRANIC				
JK3	TYPE P71	IGRANIC				
JK4	CAT. N° S1G1 BLACK	SPEARS				
JK5	CAT. N° S1G1 BLACK	SPEARS				
JK6	CAT. N° S1G1 BLACK	SPEARS				
JK7	CAT. N° S1G1 BLACK	SPEARS				
JK8	CAT. N° S1G1 BLACK	SPEARS				
JK9	CAT. N° S1G1 BLACK	SPEARS				
	TRANSFORMERS					
TR1	TO SPEC. SR/T 2513	WODEN				
TR2	TO SPEC. SR/T 2513	WODEN				
TR3	TO SPEC. SR/T 2504	WODEN				
TR4	TO SPEC. SR/T 2504	WODEN				
TR5	TO SPEC SR/T 2500	WODEN				

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	30·10·58			L.J. Stubbs	14/11/58

REDIFON LTD. LONDON.	TITLE F.S. DIVERSITY CONVERTER AFS 11	SHEET 11 CONT.	DWG. No. WD1/6051/L&M

S.W.B.O.S.

CIR. REF.	COMPONENT DESCRIPTION.	REF No.	VALUE	TOL %	RATING	ISSUE
TR6	To SPEC. SR/T 2505	WODEN				
TR7	To DRG. P.40350/S	REDIFON				1.
						2.
	CHOKES					
L1	To DRG. 215/6047/S	REDIFON				
L2	To SPEC. SR/T 4102	WODEN				3
L3	To SPEC. SR/T 4102	WODEN				
	FILTER.					
LPF1	To SPEC. OP 8034/S	AVELEY ELECTRIC				
	PLUGS					
PL1	TYPE P429	BULGIN				
	SOCKETS					
SK1	TYPE P430	BULGIN.				
SK2	TYPE RSD 16	Mc MURDO				
SK3	TYPE RSD 16	Mc MURDO				
	SWITCHES					
SW1	To SPEC. OP8029/S	N.S.F	5 POLE 2 WAY			
SW2	To SPEC. OP8030/S	N.S.F.	5 POLE 3 WAY			
SW3	TYPE 8373/K7 DPDT	N.S.F.	2P. 2WAY			
SW4	TYPE 8373/K7 DPDT	N.S.F	2P. 2WAY			
SW5	TYPE 8373/K7 DPDT	N.S.F.	2P. 2WAY			

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	30·10·58			L.J. Hulls	14/11/58

REDIFON LTD. LONDON.	TITLE F.S. DIVERSITY CONVERTOR AFS 11	SHEET 12 CONT.	DWG. No. WD1/6051/L&M

SW.E.O.S.

CIR. REF.	COMPONENT DESCRIPTION.	REF. No.	VALUE	TOL %	RATING	ISSUE
	METERS					
M1	To SPEC. OP 8031/S	E. TURNER	-10 To +6 DB's			1.
M2	To SPEC. OP 8031/S	E. TURNER	-10 To +6 DB's			
M3	To SPEC. 6/OP.1331/S	E. TURNER	75mA.			
	RECTIFIERS					
MR1	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR2	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR3	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR4	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR5	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR6	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR7	'SENTERCEL' CODE N° MQ6/4	S.T.C				
MR8	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR9	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR10	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR11	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR12	'SENTERCEL' CODE N° MQ6/4	S.T.C.				
MR13	TYPE OA81	MULLARD				
MR14	TYPE OA81	MULLARD				
MR15	'SENTERCEL' TYPE K8/20T	S.T.C.	480v		5mA.	
MR16	'SENTERCEL' TYPE K8/20T	S.T.C.	480v		5mA.	
MR17	'SENTERCEL' TYPE MN388/20	S.T.C.	360v		10 mA	
MR18	'SENTERCEL' TYPE K8/20T	S.T.C.	480v		5mA.	
	TAGBOARDS					
TB1.	TYPE TS1-04	WINGROVE & ROGERS	4 WAY			
TB2.	TYPE TS1-04	WINGROVE & ROGERS	4 WAY			
TB3.	TYPE 77/903	CINCH	7 WAY			

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	30·10·58			L.J. Hall	14/11/58

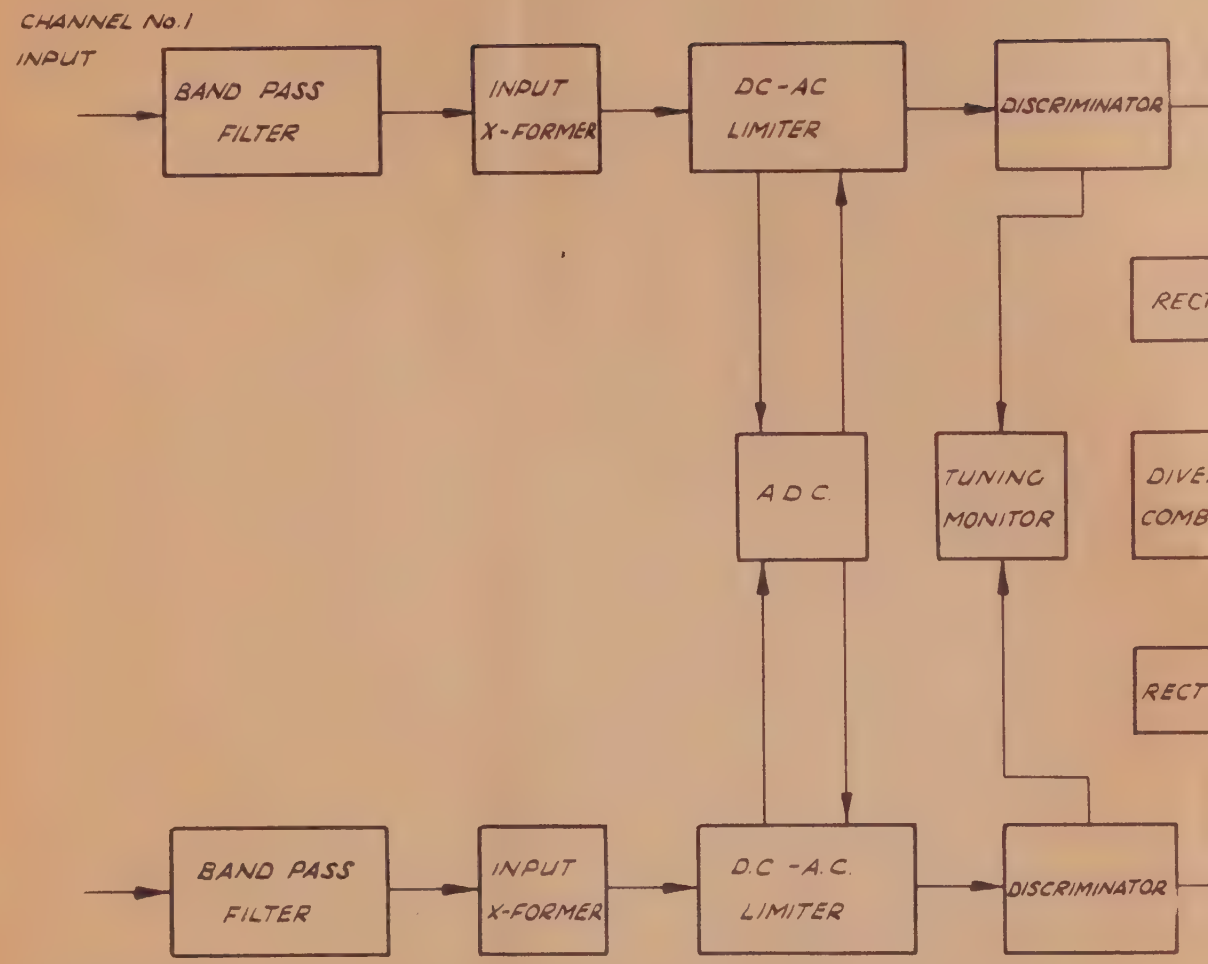
REDIFON LTD. LONDON.	TITLE F.S. DIVERSITY CONVERTOR AFS 11	SHEET 13	DWG. No. WD1/6051/L&M

E.W.B.O.S.

CIR. REF.	COMPONENT DESCRIPTION.	REF. No.	VALUE	TOL %	RATING	ISSUE
	CAPACITORS					
C201	TYPE W48 LIST N°A305	HUNTS	·05 μF	±20	250v.w	1.
C202	TYPE W48 LIST N°A306	HUNTS	·1 μF	±20	250v.w	
C203	TYPE W48 LIST N°A306	HUNTS	·1 μF	±20	250v.w	2.
C204	TYPE LG/4S	HUNTS	8000pF	±2	350v.w	
C205	TYPE LG/4S	HUNTS	7500pF	± 2	350v.w	
	RESISTORS					
R201	TYPE BTS	DUBILIER	620Ω	±10	½w	
R202	TYPE BTS	DUBILIER	120KΩ	±5	½w	
R203	TYPE BTS	DUBILIER	130KΩ	±5	½w	
	CHOKES					
L201	To SPEC. OP 8049/S		350 mH			
L202	To SPEC. OP 8049/S		500 mH			
	PLUGS					
PL201	TYPE RPD. 16, DOWEL POLARISED.	Mc MURDO	16 WAY			

DRAWN BY	DATE	ENGINEER	DATE	APPROVED BY	DATE
RCL	4·10·58			L.J. Hill	14/11/58

REDIFON LTD. LONDON	TITLE	SHEET	DWG. No.
	FREQ. DETERMINING NETWORK	2 OF 2	WD1/6053/S



APPROVED

ENGINEER

C.S. 12.5.59.

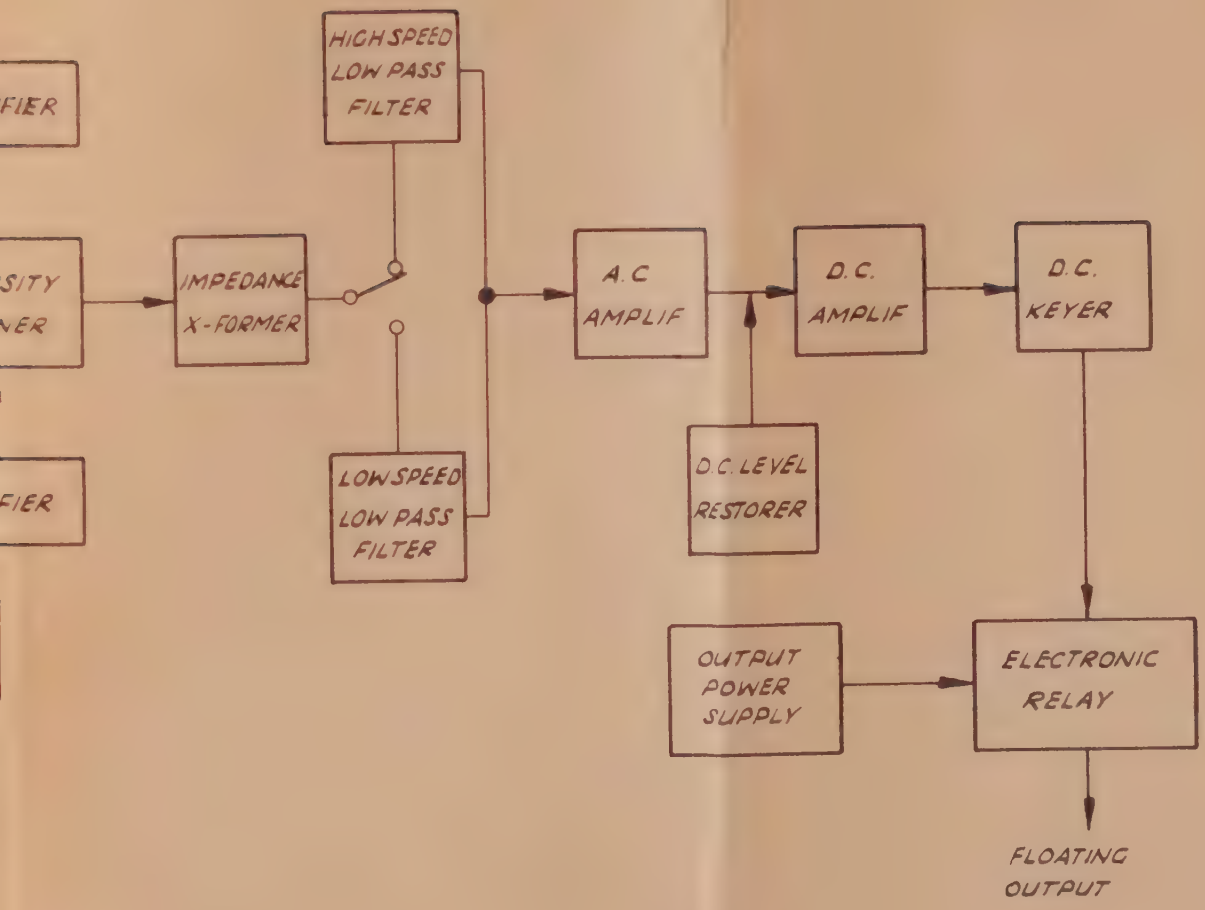
TRACED

DRAWN

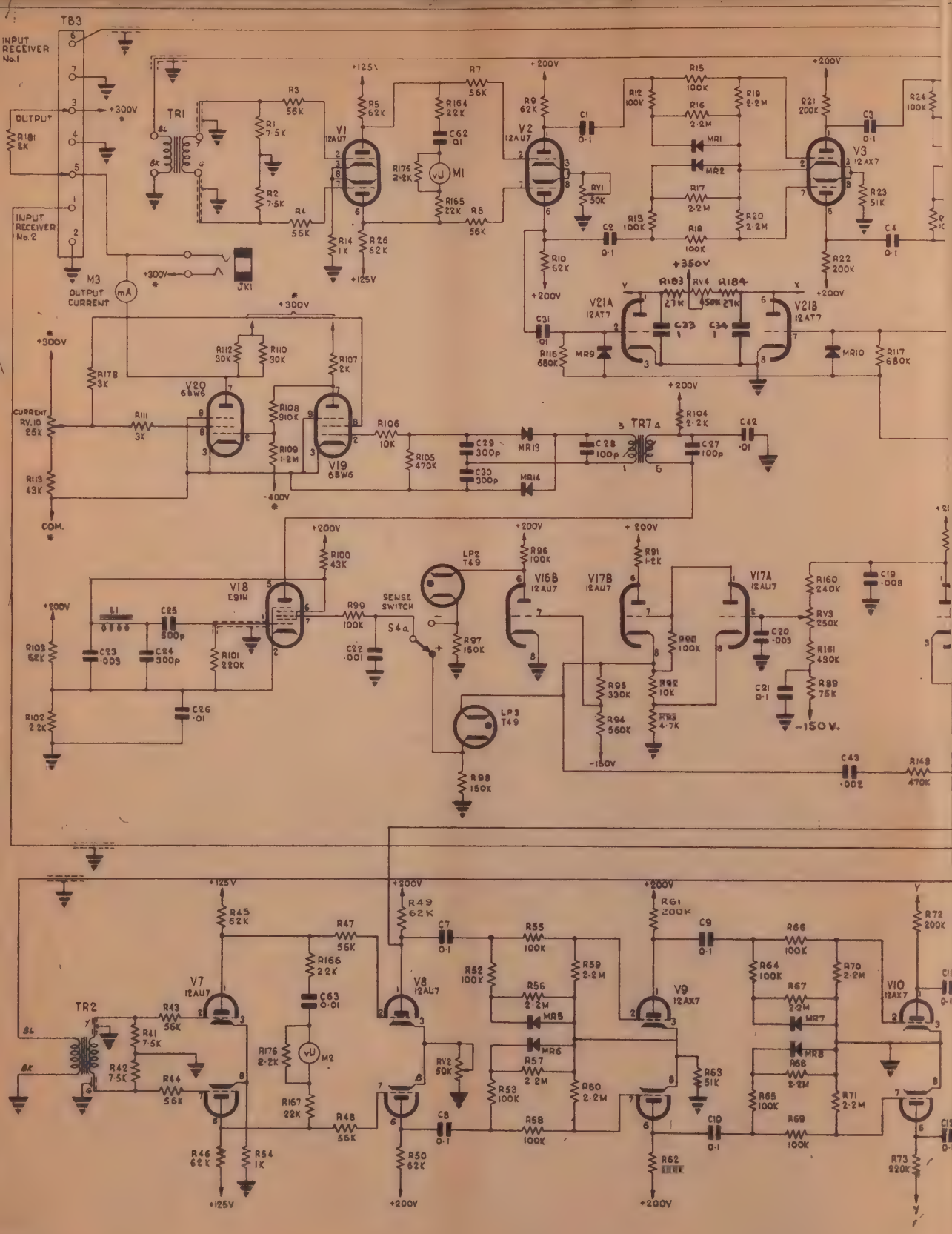
REDIFON LTD. LONDON

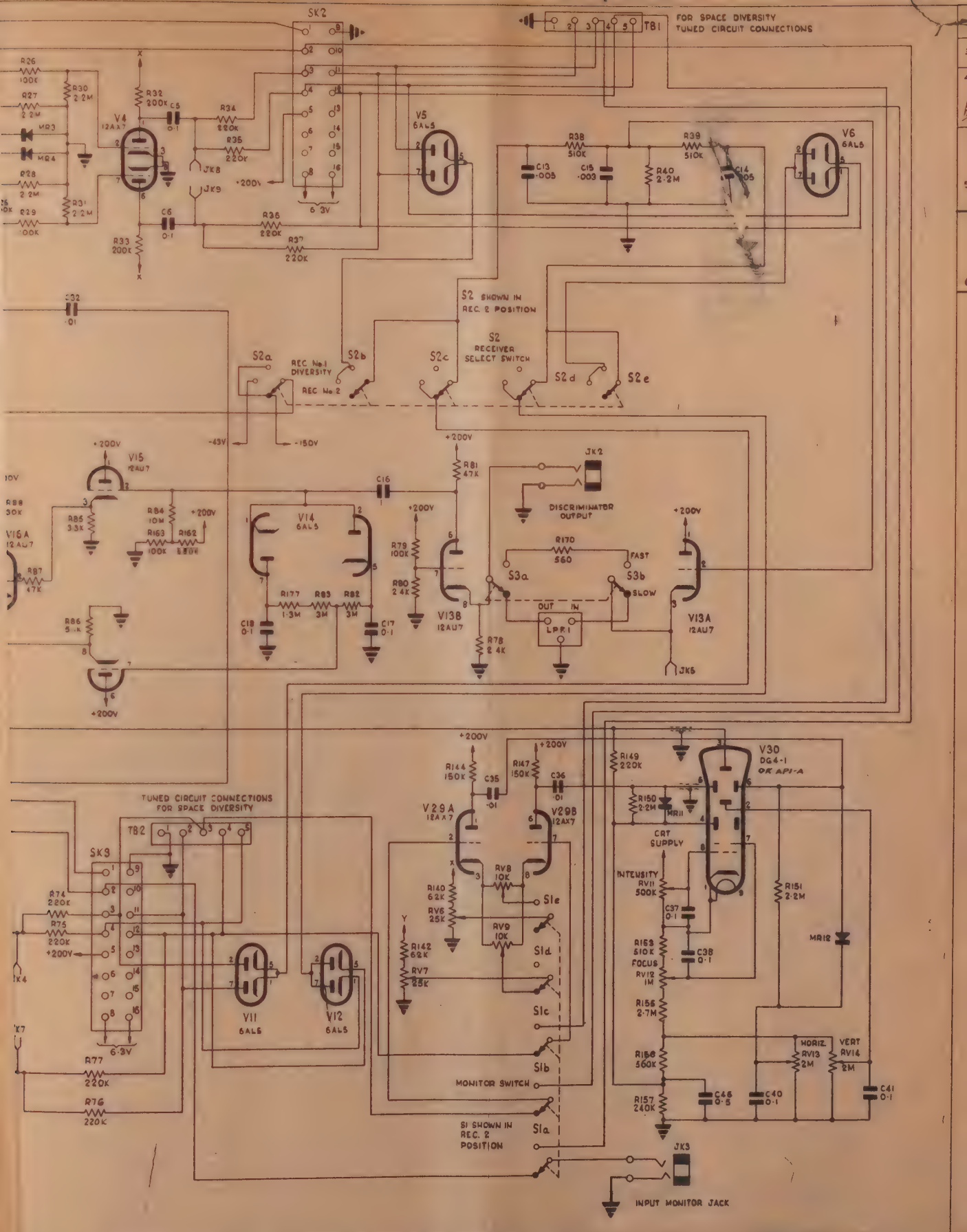
TITLE

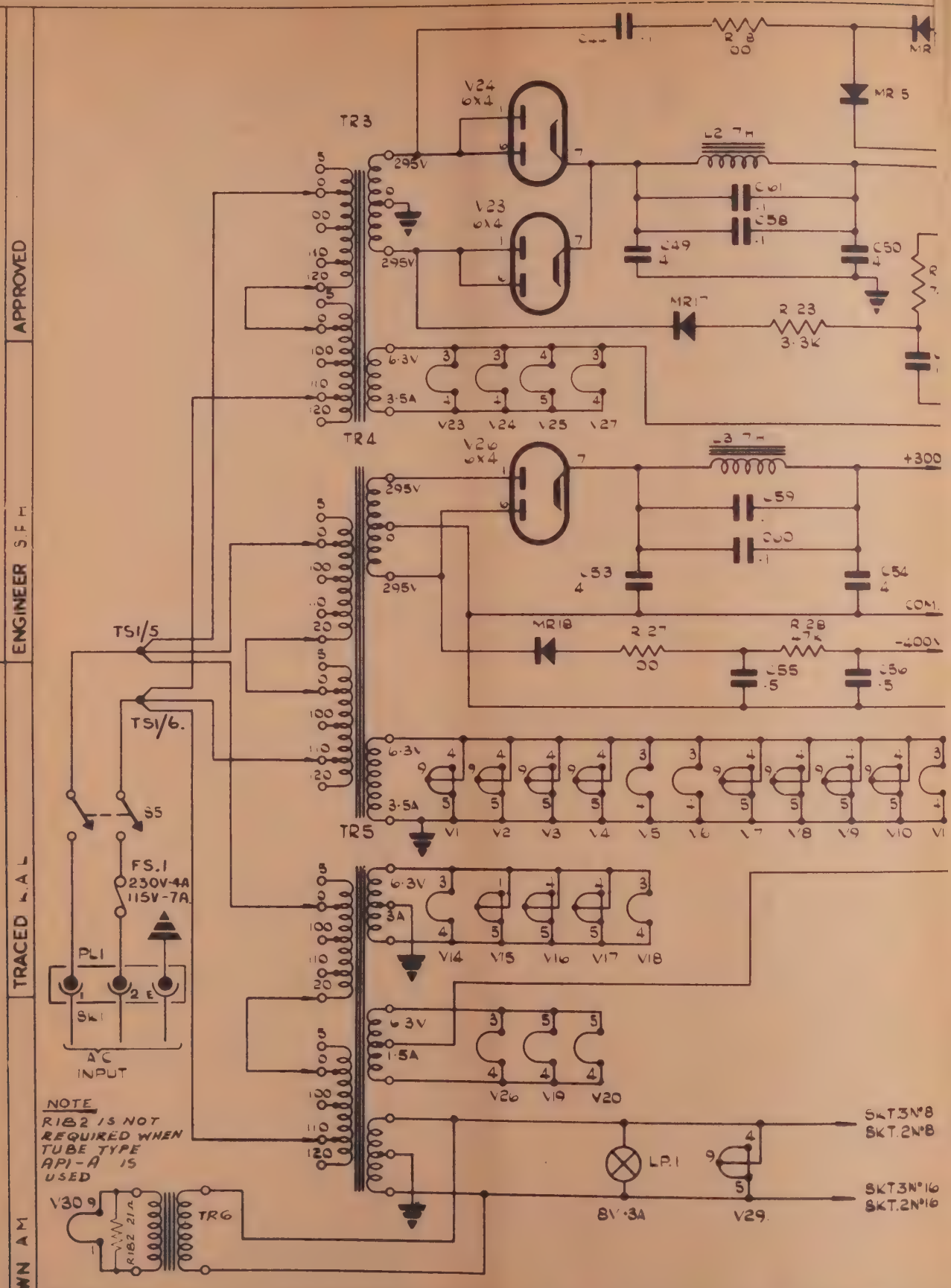
BLOCK DIAGRAM A.F.S.11

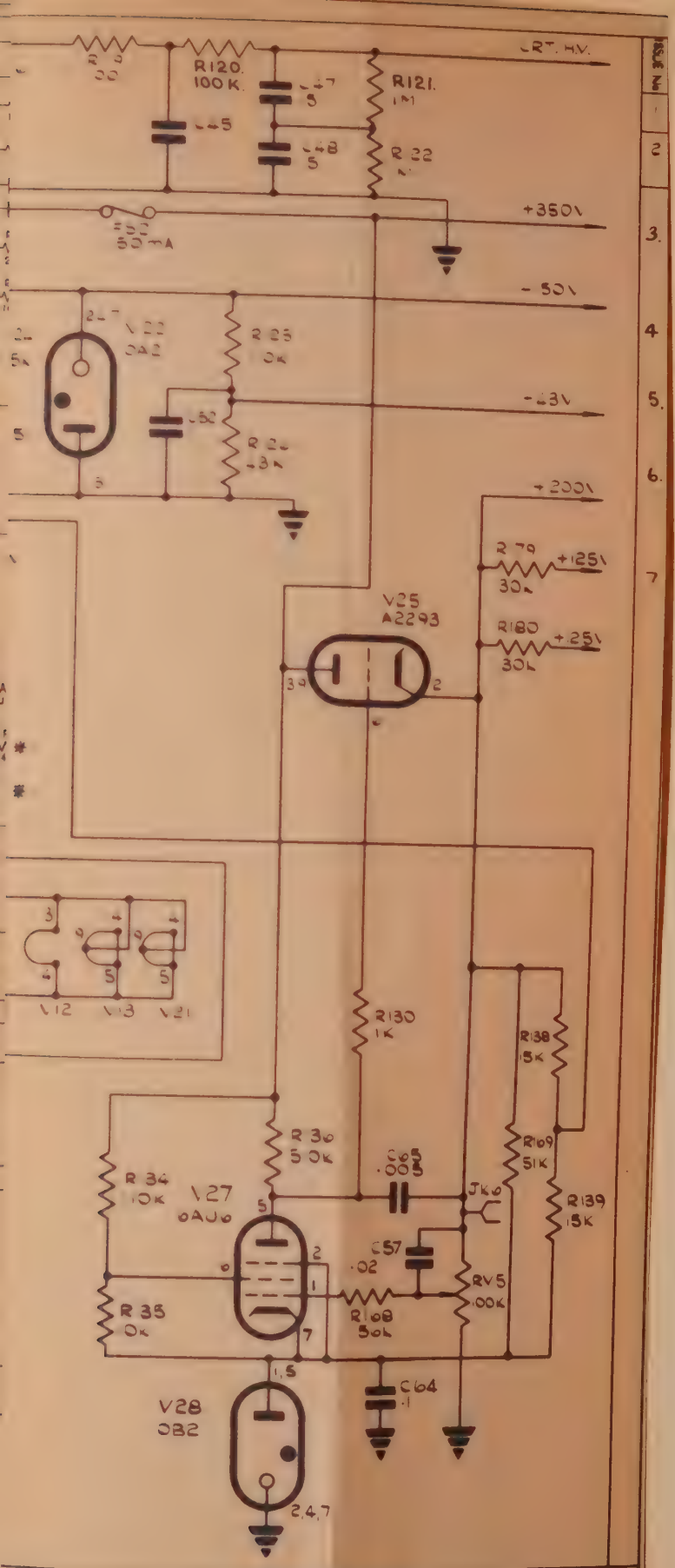


DWG NO
SK.3098/M

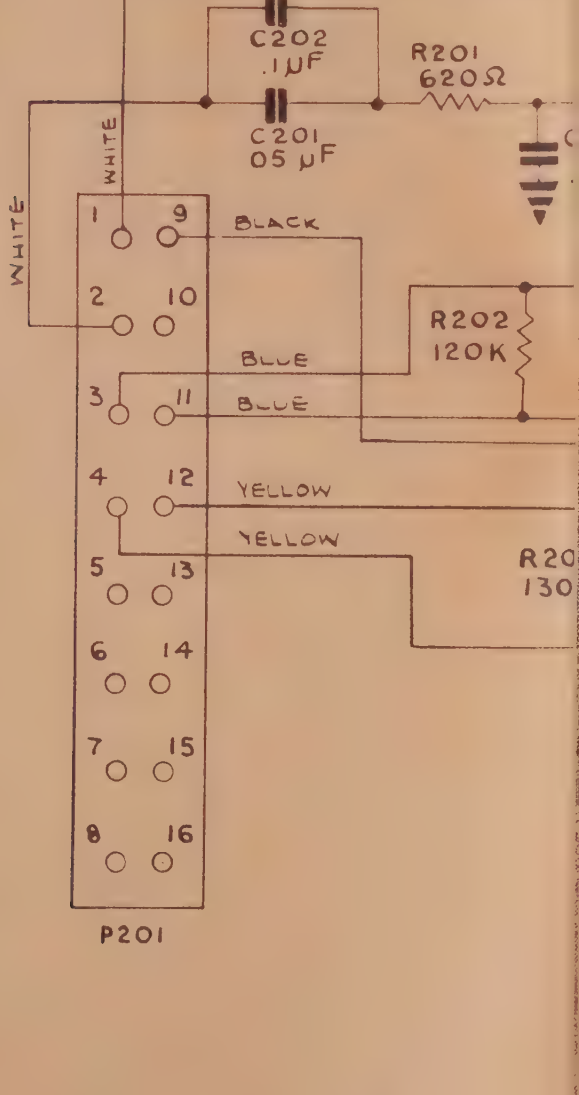

T83
INPUT RECEIVER No.1
INPUT RECEIVER No.2
OUTPUT
+300V
R181 8K
TR1
R1 7.5K
R2 7.5K
R3 56K
R4 56K
V1 12AU7
R5 62K
R14 1K
R26 62K
+125V
R7 56K
R164 22K
C62 ·01
R175 2·2K
M1
R165 22K
R8 56K
V2 12AU7
R9 62K
R10 62K
+200V
C1 0·1
R12 100K
R15 100K
R16 2·2M
R19 2·2M
MR1
MR2
R17 2·2M
R13 100K
R18 100K
R20 2·2M
RV1 30K
C2 0·1
V3 12AX7
R21 200K
C3 0·1
R24 100K
R23 51K
C4 0·1
R22 200K
M3 OUTPUT CURRENT
mA
JK1
+350V
R183 27K
RV4 50K
R184 27K
V21A 12AT7
V21B 12AT7
C33 1
C34 1
C31 ·01
R116 680K
MR9
MR10
R117 680K
R178 3K
R112 30K
R110 30K
R107 2K
V20 6BW6
V19 6BW6
CURRENT RV.10 25K
R111 3K
R113 43K
COM.
R108 910K
R109 1·2M
-400V
R106 10K
R105 470K
C29 300p
C30 300p
MR13
MR14
C28 100p
C27 100p
TR74
R104 2·2K
C42 ·01
R100 43K
V18 E91H
L1
C25 500p
R103 62K
C23 ·003
C24 300p
R101 220K
R102 2·2K
C26 ·01
R99 100K
SENSE SWITCH
S4a
C22 ·001
LP2 T49
R97 150K
R98 150K
LP3 T49
V16B 12AU7
R96 100K
R95 330K
R94 560K
V17B 12AU7
R91 1·2K
R90 100K
R92 10K
R93 4·7K
-150V
V17A 12AU7
R160 240K
RV3 250K
R161 430K
R89 75K
C20 ·003
C21 0·1
C19 ·008
C43 ·002
R148 470K
R43 62K
R47 56K
R166 2·2K
C63 0·01
V7 12AU7
TR2
R41 7·5K
R42 7·5K
R43 56K
R44 56K
R176 2·2K
M2
R167 22K
R48 56K
R46 62K
R54 1K
R49 62K
C7 0·1
V8 12AU7
RV2 50K
R50 62K
C8 0·1
R55 100K
R52 100K
R59 2·2M
R56 2·2M
MR5
MR6
R57 2·2M
R53 100K
R60 2·2M
R58 100K
R61 200K
C9 0·1
V9 12AX7
R63 51K
R62
C10 0·1
R66 100K
R64 100K
R70 2·2M
R67 2·2M
MR7
MR8
R68 2·2M
R65 100K
R71 2·2M
R69 100K
V10 12AX7
C11 0·1
C12 0·1
R72 200K
R73 220K
NOTE :-
* VOLTAGES DERIVED FROM FLOATING OUTPUT POWER SUPPLY DRG. WD1/6051/M (SHT. 2 OF THIS DRAWING)
REDIFON LTD. LONDON
TITLE F.S. DIVERSITY CONVERTER A.F.S. 11
DWG. Nº WD1/6053/S
APPROVED
ENGINEER S.F.H.
TRACED C & S Ltd 7-7-59.
DRAWN


SK2
TB1
FOR SPACE DIVERSITY
TUNED CIRCUIT CONNECTIONS
V4
12AX7
V5
6AL5
V6
6AL5
S2 SHOWN IN
REC. 2 POSITION
S2
RECEIVER
SELECT SWITCH
S2a
S2b
S2c
S2d
S2e
REC No.1
DIVERSITY
REC No.2
+200V
-45V
-150V
V15
12AU7
V16A
12AU7
V14
6AL5
V13B
12AU7
V13A
12AU7
JK2
DISCRIMINATOR
OUTPUT
FAST
SLOW
S3a
S3b
OUT
IN
LPF1
JK6
TUNED CIRCUIT CONNECTIONS
FOR SPACE DIVERSITY
TB2
SK3
V11
6AL5
V12
6AL5
V29A
12AX7
V29B
12AX7
V30
DG4-1
OR API-A
CRT
SUPPLY
INTENSITY
RV11
500K
FOCUS
RV12
1M
HORIZ.
RV13
2M
VERT
RV14
2M
MONITOR SWITCH
S1 SHOWN IN
REC. 2
POSITION
S1a
S1b
S1c
S1d
S1e
JK3
INPUT MONITOR JACK
DRG NO.
WD1/6051/L
SHEE


APPROVED
ENGINEER S.F.H
TRACED L.A.L
DRAWN A.M
TR3
TR4
TR5
V24 6X4
V23 6X4
V26 6X4
295V
MR5
MR17
MR18
R 23 3·3K
R 27 100
R 28 47K
C49 4
C50 4
C53 4
C54 4
C55 .5
C56 .5
C58 .1
C59 .1
C60 .1
2·7H
+300
COM.
-400V
6·3V 3·5A
V23 V24 V25 V27
V1 V2 V3 V4 V5 V6 V7 V8 V9 V10 V11
V14 V15 V16 V17 V18
6·3V 3A
6·3V 1·5A
V26 V19 V20
V29
V30
TS1/5
TS1/6
S5
FS.1
230V-4A
115V-7A
PL1
SK1
A.C INPUT
TR6
R182 21Ω
L.P.1
8V·3A
SKT3N°8
SKT.2N°8
SKT3N°16
SKT.2N°16
NOTE
R182 IS NOT REQUIRED WHEN TUBE TYPE API-A IS USED
REDIFON LTD. LONDON
TITLE POWER SUPPLY F.S. DIV. CONVERTER A.F.S
DR
REDIFON LTD. LONDON
TITLE F
DWG. Nº WD1/6053/S



...ll.	DRG. No WD1/6051/M	SHT. No. 2.



DRAWN A.M | TRACED M.B. | ENGINEER S.F.H. | APPROVED

REDIFON LTD. LONDON

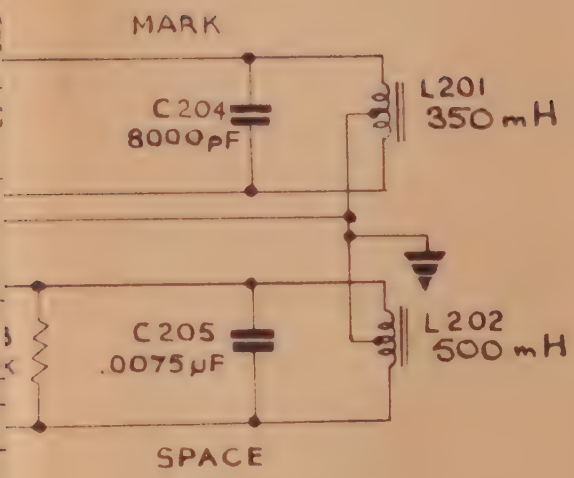
TITLE FREQUENCY DETERMINING NETW

ISSUE No

1

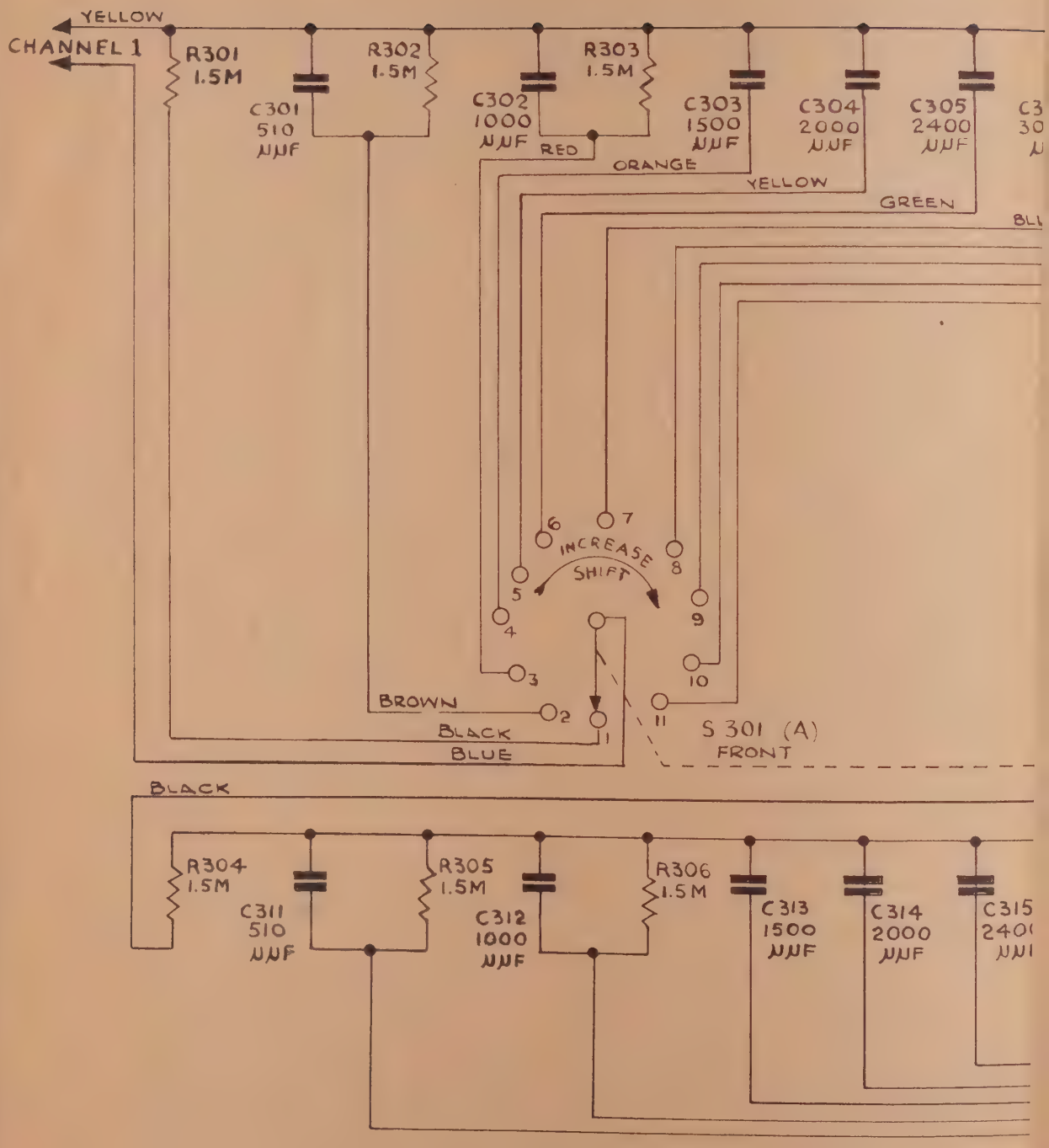
2

203
µF



DWG. Nº WD1/6053/S

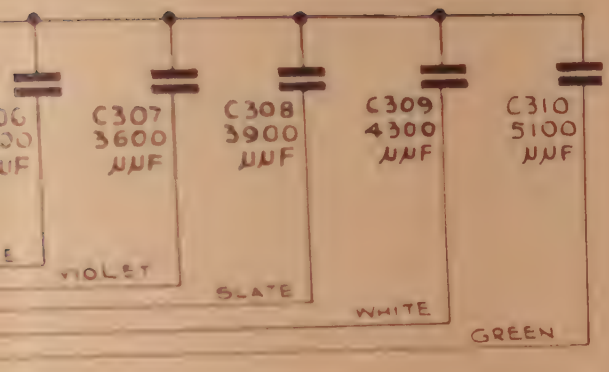
ORK

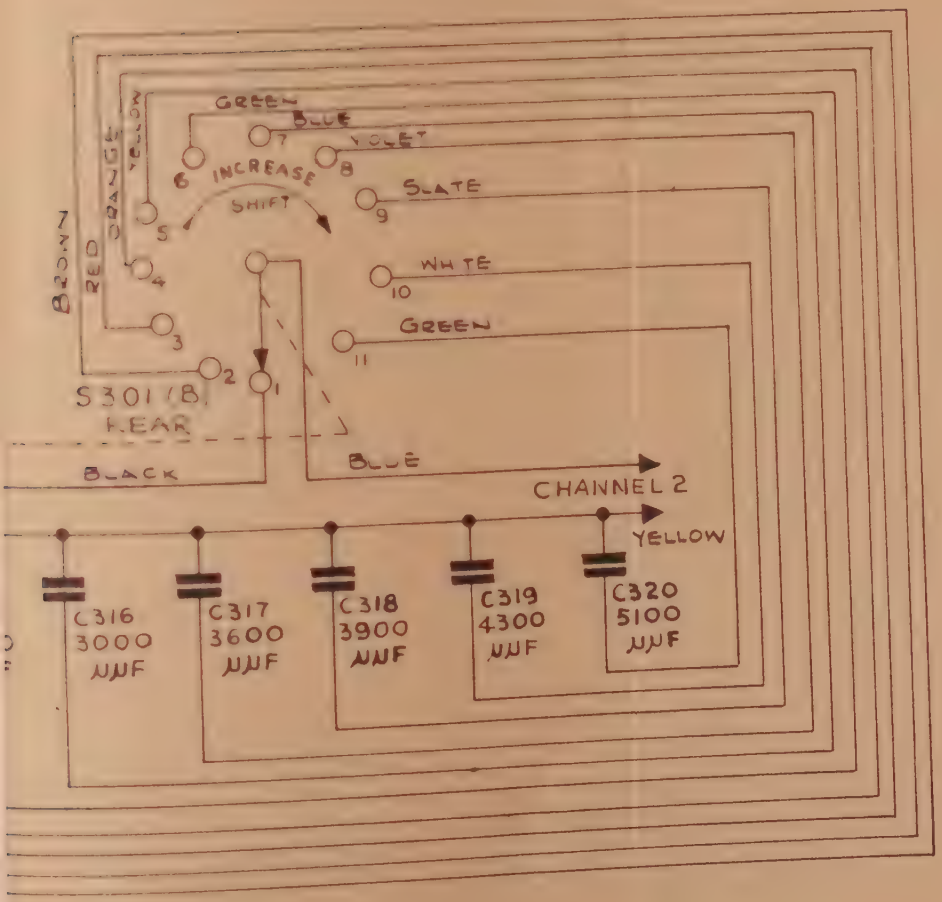


DRAWN A.M. | TRACED | ENGINEER S.F.H. | APPROVED

REDIFON LTD. LONDON

TITLE TUNING NETWORK





ISSUE M

1

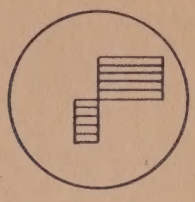
2

DRG. No. WD1/6054/M | SHEET No. 1

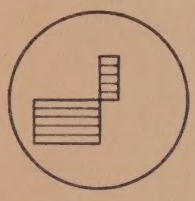
STEADY MARK

STEADY SPACE

SPACE MARK
KEYING
CONVERTOR PROPERLY TUNED



KEYING
MARK PROPERLY TUNED
SPACE MISTUNED



KEYING
SPACE PROPERLY TUNED
MARK MISTUNED

KEYING ON NOISY SIGNAL
CONVERTOR PROPERLY TUNED

MIS-KEYING
RECEIVER MIS-TUNED

KEYING ON NOISE
OR
EXTREMELY SMALL SIGNAL

CONVERTOR PROPERLY TUNED
RV4 MIS-ADJUSTED

CONVERTOR PROPERLY ADJUSTED
KEYING SPEED > 23 DOT CYCLES
SPEED SWITCH IN LOW POSITION

APPROVED

ENGINEER

TRACED C.S. 11.5.59

DRAWN

REDIFON LTD. LONDON

TITLE. TUNING PATTERNS A.F.S. 11

DWG. No. SK 3097/S.

SHEET 1

MP MASTER
MA23863